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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/558,366	11/29/2005	Kanako Nemoto	056207.57001US	4533
23911 7590 01/03/2008 CROWELL & MORING LLP INTELLECTUAL PROPERTY GROUP P.O. BOX 14300 WASHINGTON, DC 20044-4300			EXAMINER NGUYEN, TRAN N	
			ART UNIT 2834	PAPER NUMBER
			MAIL DATE 01/03/2008	DELIVERY MODE PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/558,366	Applicant(s) NEMOTO ET AL.	
	Examiner Tran N. Nguyen	Art Unit 2834	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-20 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 11/29/05 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. ____.
 3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|--|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. ____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date ____ | 6) <input type="checkbox"/> Other: ____ |

DETAILED ACTION

Priority

Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d), which papers have been placed of record in the file.

Information Disclosure Statement

The information disclosure statement filed 11/29/05 fails to comply with 37 CFR 1.98(a)(2), which **requires a legible copy of each cited foreign patent document**; each non-patent literature publication or that portion which caused it to be listed; and all other information or that portion which caused it to be listed. It has been placed in the application file, but the information referred to therein has not been considered.

Claim Objections

1. **Claims 1 and 3 are objected** because of the following:
In claim 1, there may be a typing error "1/2 ", should it be "1/2L"?
In claim 3, there may be a typing error "K axis", should it be "X-axis"?
Appropriate correction is required.

Claim Rejections - 35 USC § 112

2. **Claims 1-20** are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

In claims 1-9, the recitation of "*assuming an axial length of said one group of said rotor core or stator core as 2L*" is indefinite because of the following:

The term "*assuming*" is considered a conditional term, i.e., "*assuming*" does not definitely set a positive limitation(s) for the claimed language but rather indicates there is an indefinite condition that may be interpreted as guessing, speculating.

Also, the parameter “L” as in the following limitations: “*as 2L*”, “*0.19L, 0.81L, 0.81L, and 0.19L to 1/2L, 1/2L, 1/2(L), and 1/2L*” is unclear, to what dimension, does the parameter “L” refer?

Furthermore, the phrase “*assuming an axial length of said one group of said rotor core or stator core as 2L*” is unclear. If there is only one group, then is the axial length “as 2L” is equal to the total axial length?

Since the claimed language sets the rotor core or stator core being divided into 4 or 4n (as in claims 1-3, 6-8), and sets the rotor core or stator core being divided into 6 or 6n (as in claims 4, 5, 9), if there is 2 or more groups, then is each of the plural groups still having the axial length of “as 2L”?

In light of the specification, the above recitation is understood as: an axial length of said rotor core or stator core is “L”, and each group having an axial length, wherein the total axial lengths of a number of groups equal to total axial length of the rotor core or stator core.

In claims 1-9, each of claims 1-9 recites “*each piece of said one group of said four pieces, as said equivalent axial length*”. The phrase “each piece of the group’s four pieces, as said equivalent axial length” is understood as each piece of the four pieces having equal axial length, but the axial length of each piece is set to be different length.

For example:

In claim 1, the recitation of “*each piece of said one group of said four pieces, as said equivalent axial length, is set to any axial length within a range from 0.19L, 0.81L, 0.81L, and 0.19L to 1/2L, 1/2L, 1/2(L), and 1/2L*” is unclear. The phrase “each piece of the group’s four pieces, as said equivalent axial length” set the limitations of each piece of the four pieces having equal axial length, as the limitations of the axial length within a range from 1/2L, 1/2L, 1/2L and 1/2L, but in an alternative recitation within the claim 1, the axial length is set to be within a range from 0.19L, 0.81L, 0.81L, and 0.19L, i.e., the first and fourth pieces are equal while the second and third pieces are equal, and their axial length is longer than that of first and fourth pieces. Or,

In claim 4, similar indefinite issue as in to claim 1, i.e., the range being set different, then in alternation set to be the same. This makes the recitation indefinite.

In claim 2 the four axial lengths of four pieces to be within range from 0.19L, 0.81L, 0.81L, and 0.19L to 0.39L, 0.61L, 0.61L, and 0.39L. Or,

In claim 3 the four axial lengths of four pieces to be within range from 1:2:2:1;
So on and so forth for each of claims 1 to 9.

Thus, **each of claims 1-9**, the recitation of divided pieces of the rotor core or stator core to be equivalent axial length", i.e., equal axial length, but in contradiction set to be different by varying each individual piece of the four pieces. **This makes claims 1-9 to be indefinite.**

Claims 10-20 are included herein due to their dependencies.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. **Claims 1-20**, as understood, are rejected under 35 U.S.C. 103(a) as being unpatentable over **Uchida et al (US 5,355,044)** in view of **Okuma et al (JP-2001-359266)**, or in alternation being unpatentable over **Tsuchida et al (US 5,760,503)** in view of **Okuma et al (JP-2001-359266)**.

Uchida discloses an electric motor having a rotor equipped with magnets (M) (figs 1 and 4) wherein the rotor is divided into 4 or 4n pieces (fig 1 shows 4 pieces, and fig 4 shows 8 pieces, 4 forms one group) in an axial direction, and an axial length and an electrical angle of said each piece; each group having an axial length, wherein the total axial lengths of a number of groups equal to total axial length of the rotor core or stator core, said axial direction as a X-axis, an axial center as $x=0$, and electromagnetic exciting force in radial and an equivalent position shifted between said pieces in a circumferential direction.

In alternation, **Tsuchida** also discloses an electric motor having a rotor equipped with magnets (M) (figs 2, and 12-14) wherein the rotor is divided into 4 pieces in an axial direction, and an axial length and an electrical angle of said each piece; each group having an axial length, wherein the total axial lengths of a number of groups equal to total axial length of the rotor core or stator core, said axial direction as a X-axis, an axial center as $x=0$, and electromagnetic exciting force in radial and an equivalent position shifted between said pieces in a circumferential direction, and each piece of all four divided pieces of the rotor core having equal axial length.

Uchida or in alternation **Tsuchida** each substantially discloses the claimed invention, except for the following:

- (a) the core is divided into 6 or $6n$ pieces, as in claims 4-5 and 9, instead of 4 or $4n$ pieces as disclosed in the prior art.*
- (b) the axial length of each piece to be within a range, as set in claims 1-9;*
- (c) the effective pole opening angles are arranged in the circumferential direction as a phase difference of electrical angles of said neighboring pieces equivalent to $0, \pi, 0$, and π .*

Okuma, however, teaches an electric motor having a rotor equipped with magnets (M) (figs 1 and 4) wherein the rotor is divided into plurality of pieces, wherein the axial length of the divided pieces of the core are different (fig 7). **Okuma** particularly teaches that the effective opening angle of the rotor is obtained by adding an angle corresponding to one slot opening to a value of integer times the slot pitch of the stator. Therefore, the rotor can be divided into a plurality of pieces, in the axial direction, and the respective divided rotor pieces are arranged circumferentially, so as the divided pieces to be shifted from each other corresponding to half a period of respective cogging torques of the divided rotor pieces.

Those skilled in the art would understand that, in order to reduce cogging torque, **Okuma** teaches the following:

the core can be divided into plurality of pieces, i.e., in to 4 pieces or 6 pieces or more, wherein the axial length of the divided pieces can be different or equivalent (as show in figs 5 and 7); and,

the effective opening angle of the circumferentially shifted divided core pieces is set in relation with the stator configuration and cogging torque period (as in Abstract).

Thus, by applying this important teaching of **Okuma**, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the motor by dividing the core into 6 or 6n divided pieces, wherein the divided core piece having different axial length, and arranging the divided pieces so that the effective pole opening angles are arranged in the circumferential direction as a phase difference of electrical angles of said neighboring pieces equivalent to $0, \pi, 0, \text{ and } \pi$, as in the claimed invention. Doing so would provide the motor with maximum cogging torque reduction resulting in improving the efficient performance thereof. Also, it would have been obvious to an artisan with necessary knowledge and skills to apply the **Okuma**'s teaching to modify the motor by determining the optimum or workable ranges of: numbers of divided core pieces; axial lengths of the divided core pieces, and the effective pole opening angles arrangement, as in the claimed invention for reducing cogging torque because it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. *In re Aller*, 105 USPQ 233.

Regarding the math expression in claims 1-9, to one skilled in the art this would be a matter of expressing a known knowledge in terms of mathematic. *A novel and useful structure* created with the aid of knowledge of scientific truth may be patentable, in this case applying the **Okuma**'s teaching to modify the motor by determining the optimum or workable ranges of: numbers of divided core pieces; axial lengths of the divided core pieces, and the effective pole opening angles arrangement, as in the claimed invention for reducing cogging torque, while a scientific truth or the mathematical expression of it is not patentable invention. *MPEP 2106 Patentable subject matter, Mackay Radio & Telegraph Co. V. Radio Corp. Of America*, 306 US 86, 94 (1939) and *Warmerdam*, 33 F.3d at 1360, 31 USPQ2d at 1759.

Communication

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Tran N. Nguyen whose telephone number is 571-272-2030 or **via email at Tran.Nguyen@USPTO.gov**

The examiner can normally be reached on 7:00 AM - 4:00 PM. If attempts to reach the examiner by telephone are unsuccessful, the Examiner can be reached via email. The applicant is advised that all communications via email are unofficial, emailing is only an alternative way to establish contact with the Examiner.

If attempts to reach the examiner by telephone or email are unsuccessful, the examiner's supervisor, Darren Schuberg can be reached on 571-272-2044. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300. (**Note: Use this Central Fax number 571-273-8300 for all official response.**)

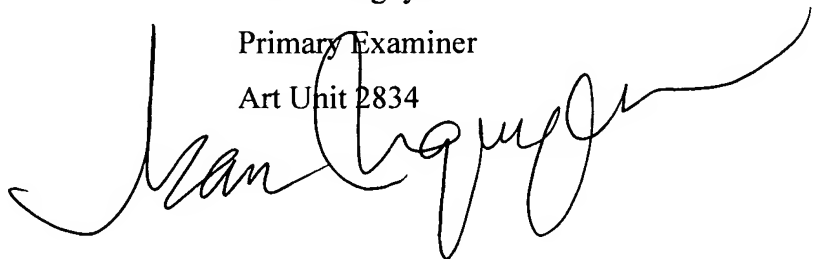
Do **not** use the Examiner's RightFax number without informing the Examiner first because, according to the USPTO policy, any document being sent via RightFax is treated as unofficial response and will not be officially dated until it is routed to the Central Fax.

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Tran N. Nguyen

Primary Examiner

Art Unit 2834

A handwritten signature in black ink, appearing to read 'Tran N. Nguyen', is written over the typed name and title.